Fine Particle Special Studies
Relevant in California

Why Special Studies?

Basic Science in Support of :

- **Effects Studies**
  - Health, Visibility, Economics
- **Methods Development**
  - Measurement, Analysis, Modeling
- **Cost-Effective Control Programs**
  - Design Optimal Control Programs
  - Evaluate Program Performance

Information Needs

- "Source Allocation" - Measurements
  - Determine Sources' Contributions to Excess Concentrations
- "Control Effectiveness" - Modeling
  - Predict or Confirm Concentration Changes

Early Research Visibility Studies

- ARB Tri-Cities (Oakland, Sacramento, L.A.)
  1971-3 Mass, Size, Optics
- EPA VISTTA (AZ, NV, UT, NM)
  1976-8 Size, Secondary Sulfate, Reactive Models
- EPA IMPROVE (Nat'l Parks)
  1980 - Routine Monitoring for PM2.5 & Optics
- EPA, SCE, NPS, *et al.* SCENES (AZ)
  1978-90 Ongoing Methods R&D

Quasi-Regulatory Visibility Studies

- DoD RESOLVE
  - 1982-5 Source ID, Multi- Air Basin Transport, Economic Effects
- Navajo Power Plant (AZ)
  - late '80s Tracers and Modeling
- MOHAVE (CA & AZ)
  - Field Sampling and Full Regional Model
- Lake Tahoe Visibility Network
  - 1998- Urban and Remote Network

Special Aerosol Studies
Southern California

- ACHEX 1970's
  - Particle Sizing, Limited Chemistry
- SCAQS 1980's
  - Particle Dynamics - Speciation, Growth, Transport, Nitrates
- Caltech Early 90's
  - Carbon Studies
- SCOS97-NARSTO Late 90's
  - Real-Time Single Particle Analysis and Precursor Gases, Aircraft Sampling, Organics

Statewide Aerosol Studies

- Children's Health Study
  - 10 Year Fine Particle Health Effects Study
- California Regional Particulate Air Quality Study (CRPAQS)
  - 1995 Integrated Monitoring Study
  - 2001 Regional Study

State of the Art

- Aerosol Behavior
  - Seasonal and Spatial Variation
  - Chemistry of Primary and Secondary Particles
  - Chemical Tracers for Most Aerosol Sources
- Sampling Technology
  - Size Segregation
  - Chemical Analysis
  - Artifact Control
- Continuous Measurement
  - Single Particle Analysis
  - Nitrate, Sulfate, OC & Precursors